M207- Review Homework - Analytic Trigonometry

Using Basic Identities

1) If $\sin x = \dfrac{1}{2}$ and $\cos x = \dfrac{\sqrt{3}}{2}$, evaluate: $\csc x$

2) . If $\csc x = \dfrac{4\sqrt{3}}{3}$ and $\cos x < 0$, evaluate: $\cos x$

3) Which of the following is equivalent to the expression $\sin\theta\sec\theta$?
   a. $\tan\theta$
   b. $\csc\theta$
   c. -1
   d. 1
   e. $\cos\theta$

4) Which of the following is equivalent to the expression:
   $\cos^2\theta\left(\sec^2\theta - 1\right)$
   a. $\sin^2\theta$
   b. $\tan^2\theta$
   c. -1
   d. $\sec\theta$
   e. $\cot^2\theta$

5) If $x = 6\sin\theta$, use trigonometric substitution to write $\sqrt{36 - x^2}$ as a trigonometric function of θ, where $-\dfrac{\pi}{2} < \theta < \dfrac{\pi}{2}$.

6) Verify the identity:
   $1 - \dfrac{\tan\theta\cos\theta}{\csc\theta} = \cos^2\theta$

7) Verify the identity:
   $\dfrac{1}{1 - \sin\theta} = \sec^2\theta + \tan\theta\sec\theta$

Solving Trigonometric Equations

8) Solve the equation in the interval $[0, 2\pi)$:
   $2\cos x - 1 = 0$

9) Find all solutions of the following equation in the interval $[0, 2\pi)$.

$2\cos^2 x = 2 + \sin x$

10) Solve the multiple-angle equation in the interval $[0, 2\pi)$.

$\sin 2x = \dfrac{1}{2}$

11) Solve the equation in the interval $[0, 2\pi)$.

$\cos^2 x - 5\sin x + 5 = 0$

12) Find the exact solutions of the given equation in the interval $[0, 2\pi)$.

$\sin 2x = \sin x$

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